4. [10 points] Let h(x) be a twice differentiable function defined for all real numbers x. (So h is differentiable and its derivative h' is also differentiable.) Some values of h'(x) the derivative of h are given in the table below.

Some values of h'(x), the <u>derivative</u> of h are given in the table below.

| x | -8 | -6 | -4 | -2 | 0 | 2 | 4 | 6 | 8 |
|-------|----|----|----|----|----|----|---|----|---|
| h'(x) | 3 | 7 | 0 | -3 | -5 | -4 | 0 | -2 | 6 |

For each of the following, circle \underline{all} the correct answers.

Circle "NONE OF THESE" if none of the provided choices are correct.

a. [2 points] Circle all the intervals below in which h(x) <u>must</u> have a critical point.

 $-8 < x < -6 \qquad \boxed{-6 < x < -2} \qquad -2 < x < 2 \qquad \boxed{2 < x < 6} \qquad \boxed{6 < x < 8}$ NONE OF THESE

b. [2 points] Circle all the intervals below in which h(x) <u>must</u> have a local extremum (i.e. a local maximum or a local minimum).

$$-8 < x < -6$$
 $-6 < x < -2$ $-2 < x < 2$ $2 < x < 6$ $6 < x < 8$
NONE OF THESE

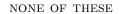
c. [2 points] Circle all the intervals below in which h(x) must have an inflection point.

 $\begin{array}{|c|c|c|c|c|c|c|c|} \hline -8 < x < -4 & \hline -4 < x < 0 & 0 < x < 4 & \hline 2 < x < 6 & \hline 4 < x < 8 & \hline \end{array}$

NONE OF THESE

d. [2 points] Circle all the intervals below which <u>must</u> contain a number c such that h''(c) = 2.

 $-8 < x < -6 \qquad -4 < x < -2 \qquad -2 < x < 0 \qquad 2 < x < 4 \qquad 6 < x < 8$



e. [2 points] Suppose that h''(x) < 0 for x < -8, and h(-8) = 7. Circle all the numbers below which <u>could</u> equal the value of h(-10).

| -2 | -1 | 0 | 1 : | 2 |
|----|----|---|-----|---|
| | | | | |

NONE OF THESE